nuclei between 70 and 82. There is no cyclic alteration in the number of chromosomes, and no migration or fusion of nuclei of prothallial cells. The embryo arises from the unfertilized egg.

In *Lastrea pseudo-mas polydactyla* Wills, the authors still maintain their claim, made in a preliminary paper, that there is a migration and fusion of prothallial nuclei, thus initiating the sporophytic phase. There is a normal reduction of chromosomes.

In *Lastrea pseudo-mas polydactyla* Dadds there is a reduction of chromosomes and the sporophyte is initiated by a migration and fusion of prothallial nuclei. The embryo, however, comes from a projection which may be regarded as an arrested archegonium.

In *Lastrea pseudo-mas cristata apospora* Druery there is no reduction of chromosomes and no migration of prothallial nuclei. The number of chromosomes shows a remarkable variation, there being 60 in nuclei of prothallial cells, about 78 in nuclei of the embryo, and about 90 in nuclei of antherozoids.

These various forms may be arranged in two categories, one in which spores are produced in connection with the usual reduction of chromosomes; and the other in which there is no spore formation or reduction of chromosomes, the embryo appearing as an outgrowth from the sporophyte. The wide variation in the number of chromosomes is not thought to be due to inaccuracy in counting, but to a real difference. The authors believe that the fluctuation might seem to negative any value being attached to the number of chromosomes.

After a lengthy discussion a general conclusion is drawn which is quite at variance with current notions, namely that there is no necessary correlation between the periodic reduction in the number of chromosomes and alternation of generations. Fertilization and reduction, however, are recognized as holding a definite causal relation to each other, but without assuming any necessary connection between either of them and any other features in the life-history.—CHARLES J. CHAMBERLAIN.

Apogamy in Marsilia.—While investigating apogamy in Alchemilla, STRASBURGER[11] realized the desirability of examining apogamy in other groups. Since Marsilia had been reported to produce embryos without fertilization, he secured material from various botanists, and even obtained sporocarps from specimens in the Kew and Berlin herbaria. Some of the sporocarps, known to have been collected more than thirty years ago, germinated readily.

In some species, notably *M. Drummondii*, the megaspores when isolated from microspores produce prothallia and embryos almost as abundantly as when microspores are present. Sections show that embryos often develop from eggs without fertilization, and that nuclei of these embryos have 32 chromosomes, the $2x$, diploid, or sporophyte number, as was found by comparing mitoses in root tips and other vegetative structures. Megaspores are formed which have $2x$ chromosomes in their nuclei, the reduction of chromosomes having failed to take

[11] STRASBURGER, E., Apogamy bei Marsilia. Flora **97**:123–191. *pls. 3–8.* 1907.

place. Such megaspores form prothallia whose nuclei have $2x$ chromosomes, and finally an egg is formed with $2x$ chromosomes, and this egg develops an embryo with $2x$ chromosomes; so that the sporophyte number of chromosomes is maintained throughout the life-history. But in the same species there are instances of reduction of chromosomes, so that prothallia and egg have the x or gametophyte number.

In forms which produce apogamous embryos, microsporogenesis is likely to be abnormal, the development often stopping before the nucleus of the microspore mother cell divides; but here again normal microspores with the reduced number of chromosomes are sometimes formed. The nuclei of the x and $2x$ prothallia can be distinguished in a general way by their size, the diameter of the nuclei in $2x$ prothallia being about one-third greater than those in x prothallia; also the diameter of the eggs with $2x$ chromosomes is about one-fourth greater than that of eggs with the reduced number.

STRASBURGER uses the term apogamy rather than parthenogenesis because he regards an egg with $2x$ chromosomes as a purely vegetative cell. He would use the term parthenogenesis only in case an egg with x chromosomes should develop an embryo without fertilization. Even if $2x$ chromosomes should appear at the first mitosis in such an egg, he would still regard it as a genuine case of parthenogenesis.

The preparations naturally showed many stages in the development of spore membranes. Shortly before the spore reaches the periphery of the vesicle containing it, the perinium appears. This is a delicate, fine-pored membrane (*Häutchen*) laid down upon the surface of the vesicle by the surrounding tapetal plasmodium. The prismatic layer is then laid down upon the delicate membrane. The exine, mesopore, and endospore are then developed in succession upon the protoplast of the spore. This study supports the view that cell membranes arise only in direct relation with protoplasm.—CHARLES J. CHAMBERLAIN.

Items of taxonomic interest.—S. M. BAIN and S. H. ESSARY (Jour. Mycol. **12**:192, 193. 1906) have described a new anthracnose of alfalfa and red clover (*Colletotrichum trifolii*), which is said to be the most serious plant disease occurring in Tennessee.—J. M. GREENMAN (Field Columbian Mus. Publ. Bot. Ser. **2**:185–190. 1907) has published 10 new species of Citharexylum as preliminary to a synoptical revision of the genus.—E. HASSLER (Bull. Herb. Boiss. II. **7**:161–164. *figs.* 5. 1907) has described a new genus (*Dolichopsis*) of Leguminosae from Paraguay.—L. A. DODE (*idem* 247, 248. *figs.* 3) has described a new species of Juglans (*J. elaeopyren*) from the Santa Catalina Mountains of Arizona; it is distributed in Pringle of 1881 as *J. rupestris* Engelm., and the type is in Herb. Barbey-Boissier.—A. H. MOORE (Proc. Amer. Acad. **42**:521–569. 1907), in a revision of the confused genus Spilanthes, recognizes 63 species; describes as new 2 subsections, 8 species, 4 varieties, and 7 forms; and makes 14 new combinations.—W. H. BLANCHARD (Torreya **7**:55–57. 1907) has described a new Rubus (blackberry) from the vicinity of Philadelphia and Washington.—J. R.